

Asbestos Constituent Analysis

MVA Project No. 5394

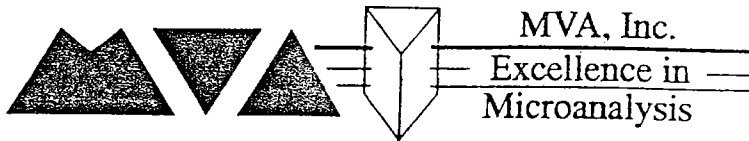
W.R. Grace Claim #14411

DGS Claim #1011586

**Building Address:
7650 South Newcastle Road, Stockton**

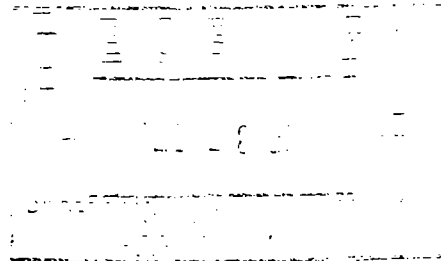
Prepared by:

**Department of General Services
Real Estate Services Division
Professional Services Branch
707 3rd Street, 4th Floor
West Sacramento, CA 95605**



27 February 2003

Mr. Dan Hood, Project Manager
Department of General Services
Real Estate Services Division
Professional Services Branch
707 3rd Street, Suite 4-430
West Sacramento, CA 95605



Re: Asbestos Constituent Analysis, Contract No. 3056115; MVA Project No. 5394

Dear Mr. Hood:

Enclosed is our report for product formula matching conducted on thirteen (13) samples of acoustical plaster collected from various buildings. In three samples we found no asbestos (two from 120 S. Spring Street and one from 2501 Harbor Blvd. Costa Mesa, Building 3234). Two samples had compositions inconsistent with any US Gypsum or W.R. Grace product (the sample labeled DSA 3671 and the sample from 28 Civic Ctr. Plaza, Santa Ana). One sample from 2501 Harbor Blvd., Costa Mesa. Bldg. 3265 had several layers and we were unable to unambiguously separate them for constituent analysis.

One sample from 2501 Harbor Blvd., Costa Mesa. Bldg. 3265 was a positive match for W.R. Grace's "Zonolite Acoustical Plastic." The remaining samples were a positive match for W.R. Grace's MonoKote (MK-3).

Thank you for consulting MVA, Inc. Please contact us if you have any questions.

Sincerely,

Randy Boltin
Senior Research Scientist

Tim B. Vander Wood, Ph.D.
Executive Director

Report of Results: MVA5394

**Constituent Analysis
Various Buildings**

Prepared for:

**Mr. Dan Hood, Project Manager
Department of General Services
Real Estate Services Division
Professional Services Branch
707 3rd Street, Suite 4-430
West Sacramento, CA 95605**

Prepared by:

**MVA, Inc.
5500 Oakbrook Parkway, Suite 200
Norcross, GA 30093**

27 February 2003

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5500 Oakbrook Parkway #200
Norcross, GA 30093
770-662-8509 • FAX 770-662-8532
www.mvainc.com

Report of Results: MVA5394

Constituent Analysis Various Buildings

Introduction

This report contains the analytical results and their interpretation for thirteen samples of suspected asbestos containing building materials from various buildings that were sent to MVA, Inc. under Agreement #3056115. The samples were first examined by polarized light microscopy (PLM) including microchemical tests. If necessary, the samples were further analyzed by scanning electron microscopy (SEM) combined with energy dispersive x-ray spectrometry (EDS), and by analytical electron microscopy (AEM) utilizing EDS and/or selected area electron diffraction (SAED). Wet chemistry was also performed on certain samples to determine a soluble weight percent. The results of all analyses and a data interpretation sheet for the samples are included as an appendix to this report.

Product formula matches were derived from comparison between determined sample composition and available product formulas. In any case where more than one product formula matched the determined composition, each match was noted. If no available product formula matched the determined sample composition, a 'no match' was indicated.

Results

The results of product formula matching for the samples are found in Table 1. The data on which the matches rely are included on the Data Interpretation page in the appendix.

Table 1: Summary of Results**MVA Project No. 5394****Group 1****Product Formula(s) Matched:** No Asbestos Detected

Client Sample ID	MVA Sample ID
120-1-01 (120 S. Spring St., LA)	MVA5394-N0034
120-2-03 (120 S. Spring St., LA)	MVA5394-N0036
3277-2-05 (2501 Harbor Blvd. Costa Mesa)	MVA5394-N0046

Group 2**Product Formula(s) Matched:** No Match

Client Sample ID	MVA Sample ID
DSA 3671-FP-1803-01	MVA5394-N0030
28-2-03 (28 Civic Center Plaza, Santa Ana)	MVA5394-N0040
3265-1-01 (2501 Harbor Blvd. Costa Mesa)	MVA5394-N0042

Group 3**Product Formula(s) Matched:** Zonolite Acoustical Plastic

Client Sample ID	MVA Sample ID
3234-1-3 (2501 Harbor Blvd., Costa Mesa)	MVA5394-N0044

MVA, Inc.

Data Interpretation

Group: 4

Sample ID: MVA5394-N0022, -N0024, -N0026, -N0028, -N0032, -N0038

Project: State of California

Location: Various

Type: N/A

Construction Date: Not Provided

Product Formula Matched: "Monokote (MK3)"

Manufacturer: W.R. Grace

Constituent Identified	Estimated Weight Percent (Avg)*
Chrysotile	~11%
Vermiculite	~34%
Gypsum including Limestone/ Precipitated Carbonate	~55%

Comments: Minor limestone/precipitated carbonate is included with gypsum.

*Estimated weight percent based on light microscopy in conjunction with acid soluble test result.

Group 4**Product Formula(s) Matched:**

MonoKote (MK3)

Client Sample ID	MVA Sample ID
34-1-8-03-FP-1 (901 Stockton State Building)	MVA5394-N0022
969-1-8-FP-03-1 (7650 S. Newcastle Rd. Bldg. 969)	MVA5394-N0024
969-1-8-03-AT-1 (7650 S. Newcastle Rd. Bldg. 969)	MVA5394-N0026
1023-1-8-03-1 (7650 S. Newcastle Rd. Bldg. 969)	MVA5394-N0028
DSA 5-FP-1803-01	MVA5394-N0032
28-1-01 (28 Civic Center Plaza, Santa Ana)	MVA5394-N0038

MVA, Inc.**PLM Constituent Analysis****Date:** 1/9/03**MVA #:** 5394**Location:** 7650 S. Newcastle Rd., Bldg. 969,
Southwest Entrance Above Ceiling Hatch**Sample I.D. #:** N0024**Client Sample I.D. #** 969-1-8-03-FP-1**Examination using the stereomicroscope:** White powder with brass-colored flakes and white fibers

<u>CONSTITUENT</u>	<u>%</u>	<u>CONSTITUENT</u>	<u>%</u>	<u>CONSTITUENT</u>	<u>%</u>
Fibers:		Pigment:		Fillers:	
Cotton	---	Binders:		Diatoms	---
Fiberglass	---	Kaolinite (-)	---	Iron Chromite	---
Filament	---	Montmorillonite (-)	---	Iron Oxide	---
Wool	---	Gypsum	~54	Limestone	*
Mineral Wool	---	Anhydrite	<1	Magnetite	~1
Hair	---	Portland Cement	---	Mica	---
Paper/Wood	---	Lime (hydrated)	---	Perlite	---
Chem. Proc.	---	Precipitated		Synthetic Foam	---
Mech. Proc.	---	Carbonate	*	Pumice	---
Synthetic	---	Starch (-)	---	Quartz	---
				Talc	---
				Vermiculite	~33

Asbestos Minerals

Chrysotile	~12	Anthophyllite	---	Tremolite/	
Amosite	---	Crocidolite	---	Actinolite	---

Comments: *Trace/minor limestone/precipitated carbonate is included in the gypsum percentage.**Analyst:** Randy Boltin

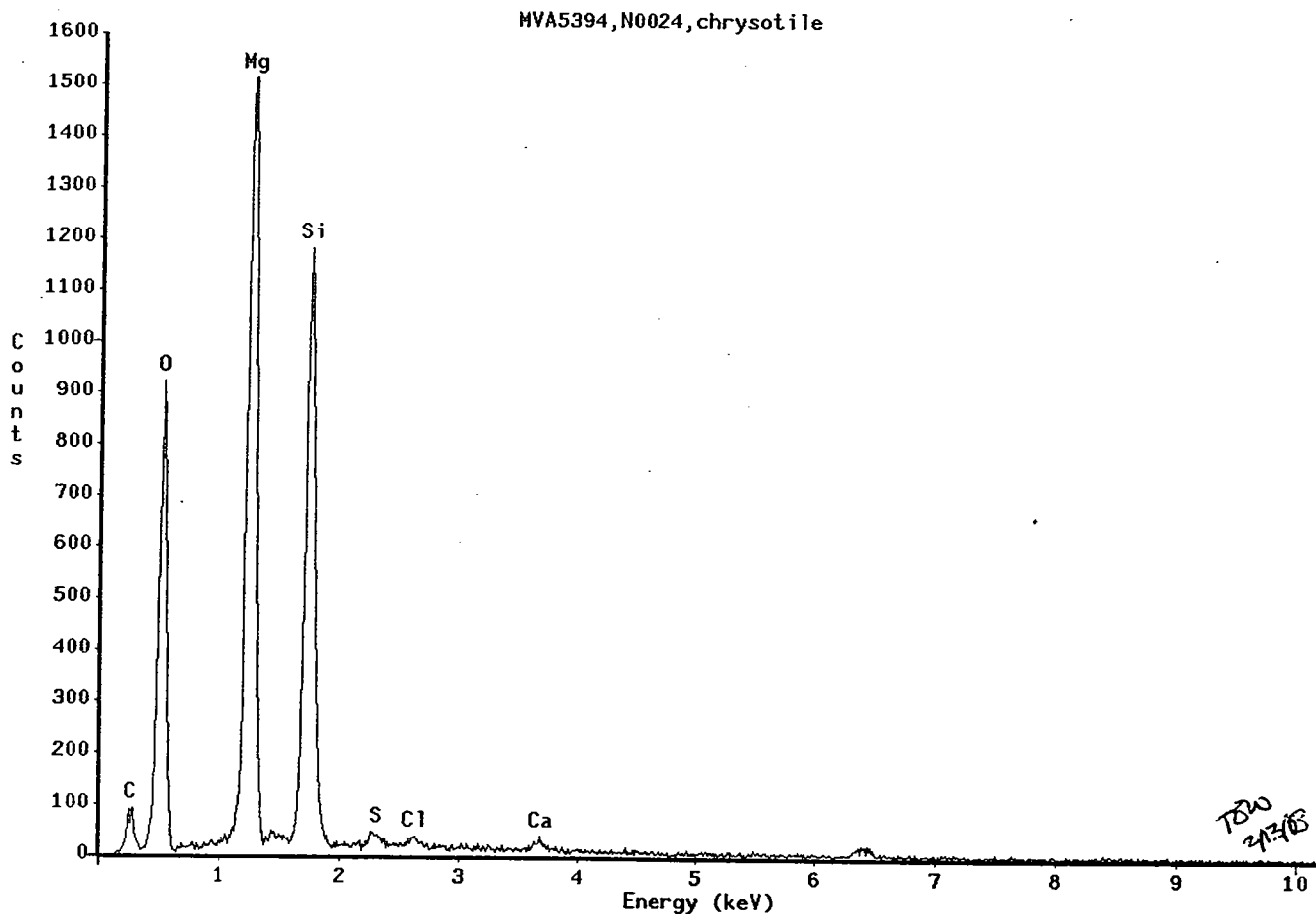
MVA, Inc.**SEM Constituent Analysis****Date:** 2/13/03**MVA #:** 5394

*Particles identified are consistent in morphology and elemental composition with known references.

Sample I.D. #: N0024

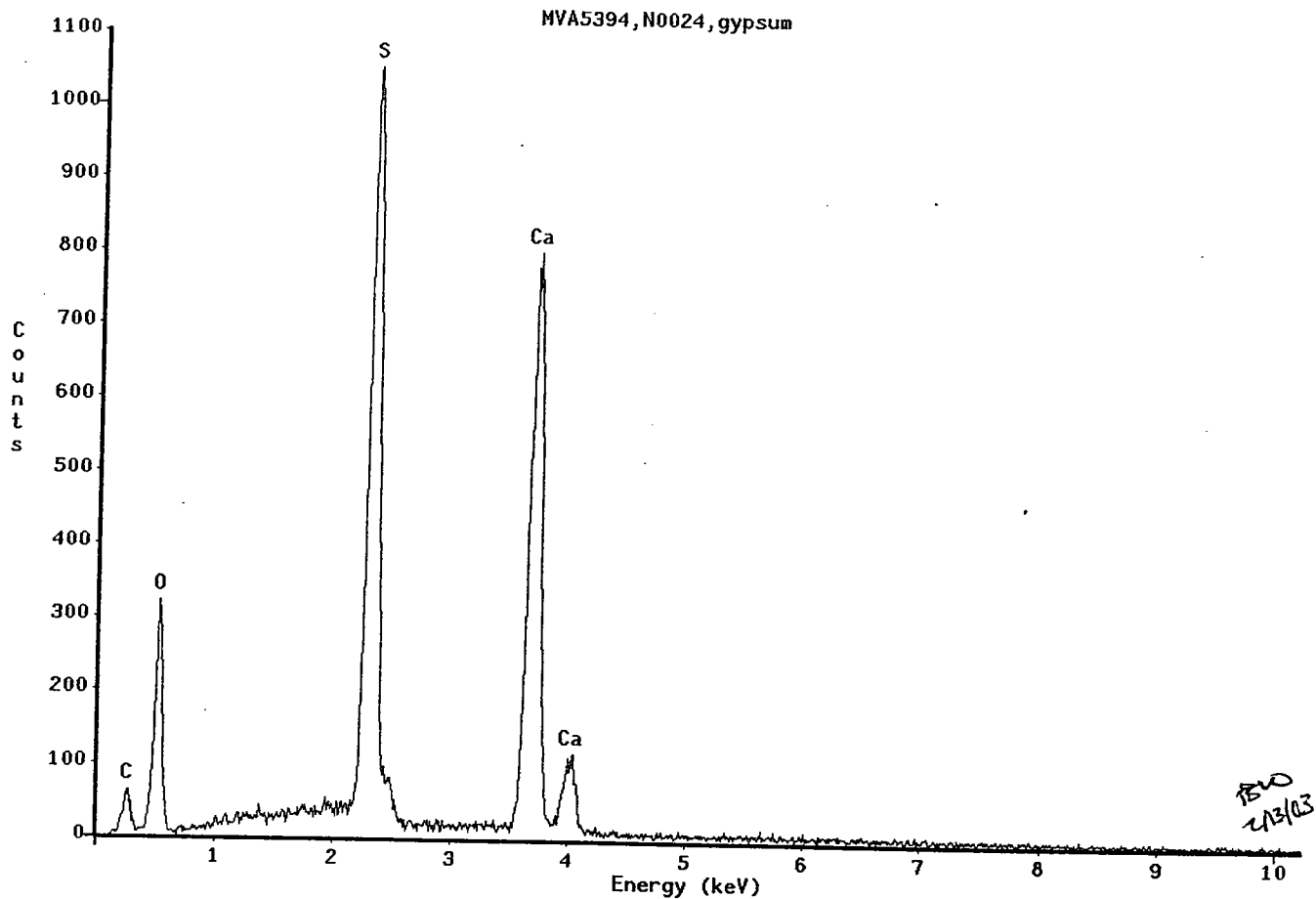
<u>CONSTITUENT</u>	<u>PRESENT</u>	<u>CONSTITUENT</u>	<u>PRESENT</u>
Fibers:		Pigments:	
Glass	---	Titanium	---
Mineral Wool	---	Barium	---
Other	---	Zinc	---
		Other	---
Fillers:		Binders:	
Diatoms	---	Clay	
Fe Particle	---	Kaolin	---
Mica	---	Montmorillonite	---
Perlite	---	Other	---
Talc (elong)	---	Ca	Trace
Talc (platy)	---	Ca-Mg	---
Si	---	Ca-S	Common
Vermiculite	Common	Ca-Si	---
Other	---	Ca-Al-Si	---
Asbestos Minerals:		Ca-Fe-Al-Si	---
Amosite	---	Mg-Fe	---
Anthophyllite	---	Al-Si	---
Chrysotile	Common	Others	---
Crocidolite	---		
Tremolite/Actinolite	---		

Comments: Lizardite may be present.**Microscopist:** Tim B. Vander Wood



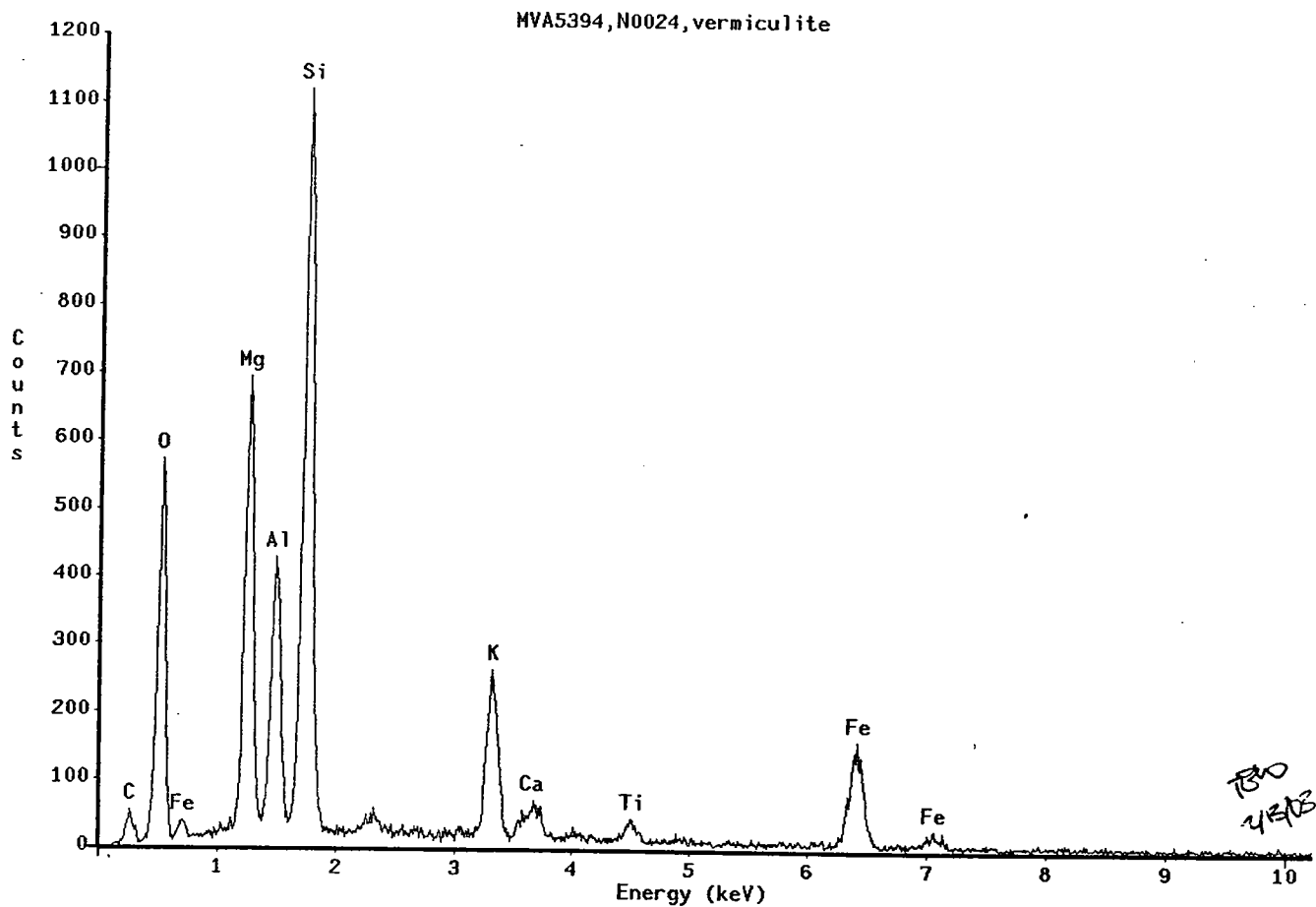
EDS spectrum (above) and SEM micrograph (below) of chrysotile.
MVA5394-N0024



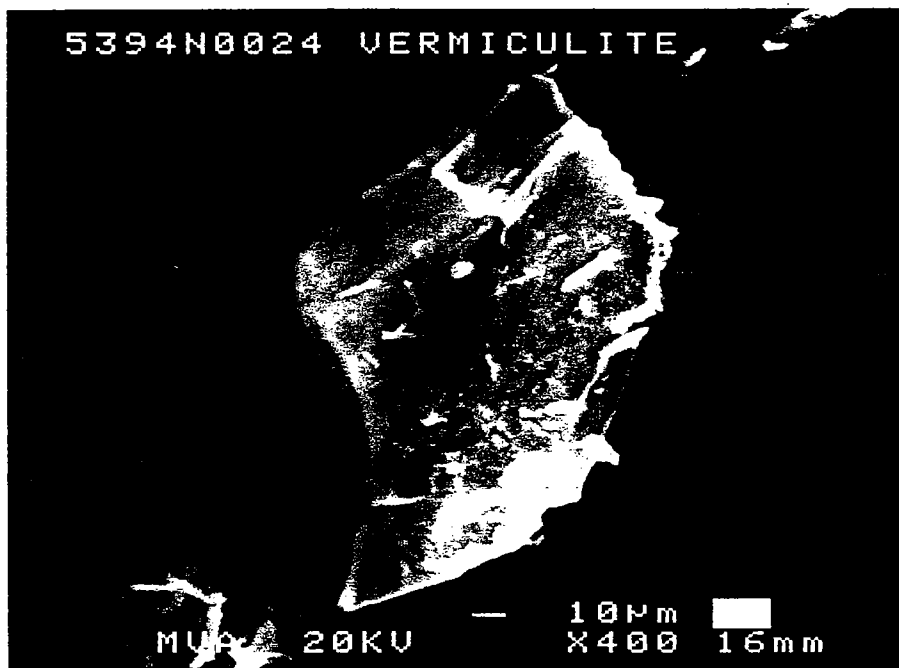


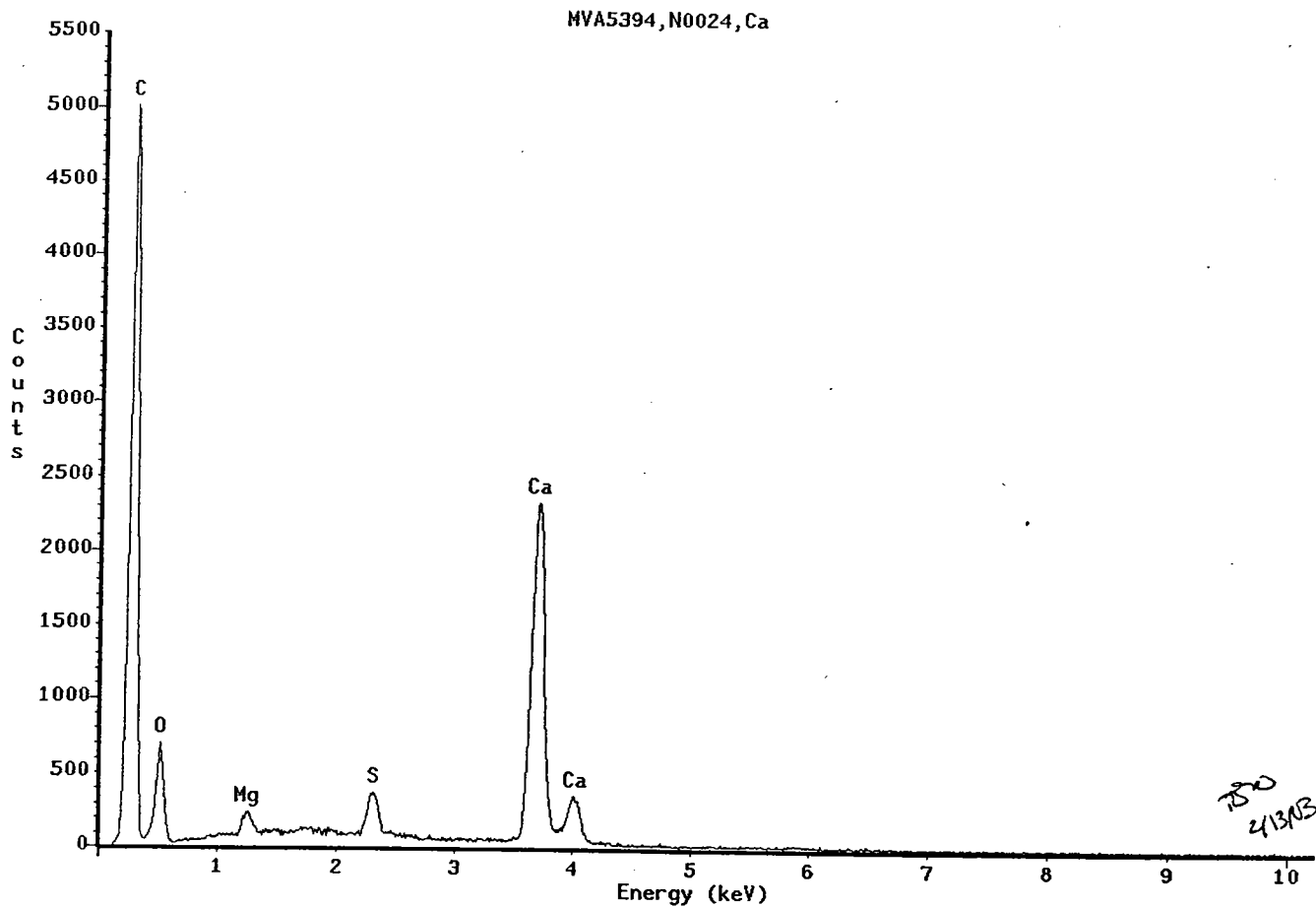
EDS spectrum (above) and SEM micrograph (below) of gypsum.
MVA5394-N0024





EDS spectrum (above) and SEM micrograph (below) of vermiculite.
MVA5394-N0024





EDS spectrum (above) and SEM micrograph (below) of a calcium particle.
MVA5394-N0024



MVA, Inc.**AEM Constituent Analysis****Date:** 2/21/03, 2/27/03**MVA #:** 5394**Sample I.D. #:** N0024

<u>CONSTITUENT</u>	<u>PRESENT</u>	<u>CONSTITUENT</u>	<u>PRESENT</u>
Fibers:		Pigments:	
Glass fibers	---	TiO ₂	---
Others	---	BaSO ₄	---
		ZnS	---
		Other	---
Fillers:		Binders:	
Diatoms	---	Clay	
Fe Particle	---	Kaolin (xltn)	---
Mica	---	Kaolin (calc.)	---
Perlite	---	Smectite	Trace
Talc (elong)	---	Ca (ppt)	---
Talc (platy)	---	Ca (xtln)	---
Quartz	---	Ca-Mg, particle	---
Vermiculite	Common	Ca-S (ppt)	---
Other	---	Ca-S (xtln)	Common
Asbestos Minerals:		Ca-Si (ppt)	---
Amosite	---	Ca-Si, particle	---
Anthophyllite	---	Ca-Al-Si	---
Chrysotile	Common	Ca-Fe-Al-Si	---
Crocidolite	---	Mg-Fe, particle	---
Tremolite/Actinolite	Trace	Mg-S	---
		Si (ppt)	---
		Si (xtln)	---
		Others	---

Comments: Single smectite particle detected, possible contaminant. Smectite properties consistent with montmorillonite.

Analyst: P. Few

QUALITATIVE ELEMENT IDENTIFICATION

SAMPLE ID: MVA5394 N0024 TREMOLITE/ACTINOLITE

POSSIBLE IDENTIFICATION

SI KA
 CU KA KB
 MG KA
 CA KA

PEAK LISTING

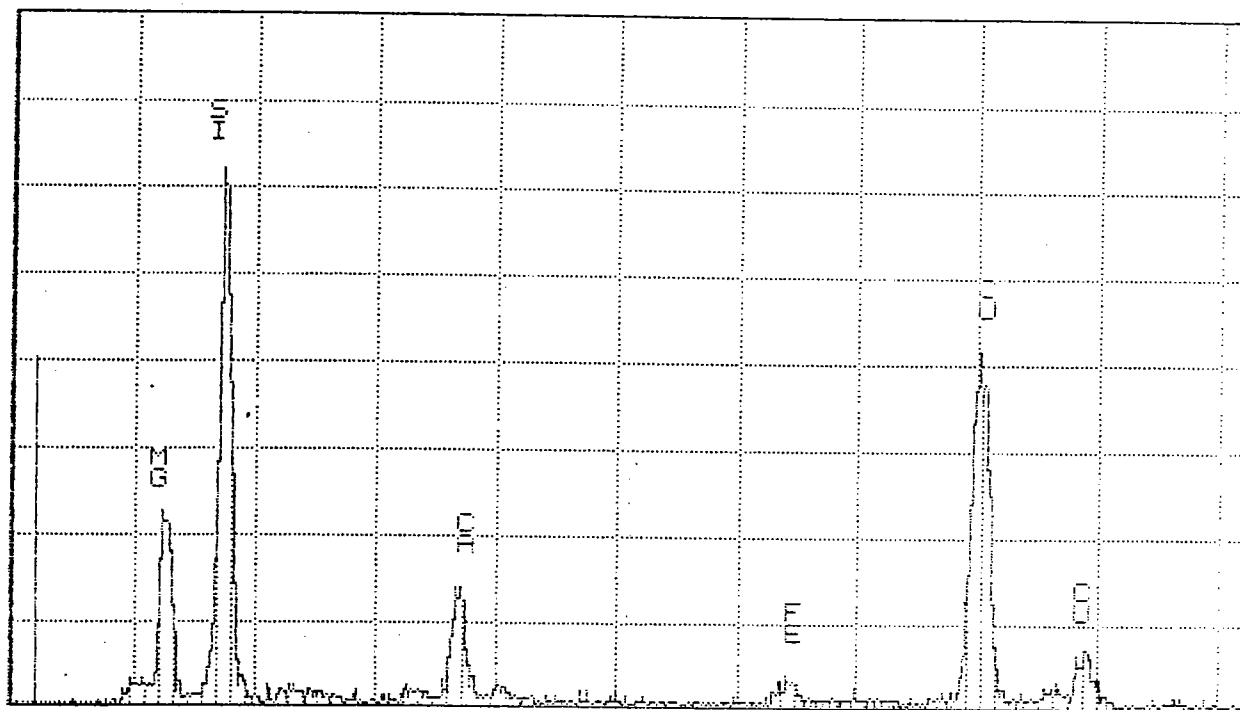
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1	1.254	499	MG KA
2	1.743	1344	SI KA
3	3.687	323	CA KA
4	8.024	1062	CU KA
5	8.091	143	CU KB

MVA INC.

FRI 21-FEB-03 15:25

Cursor: 0.000keV = 0

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0.000 8-5 VFS = 128 10.240

78 MVA5394 N0024 TREMOLITE/ACTINOLITE

P032503

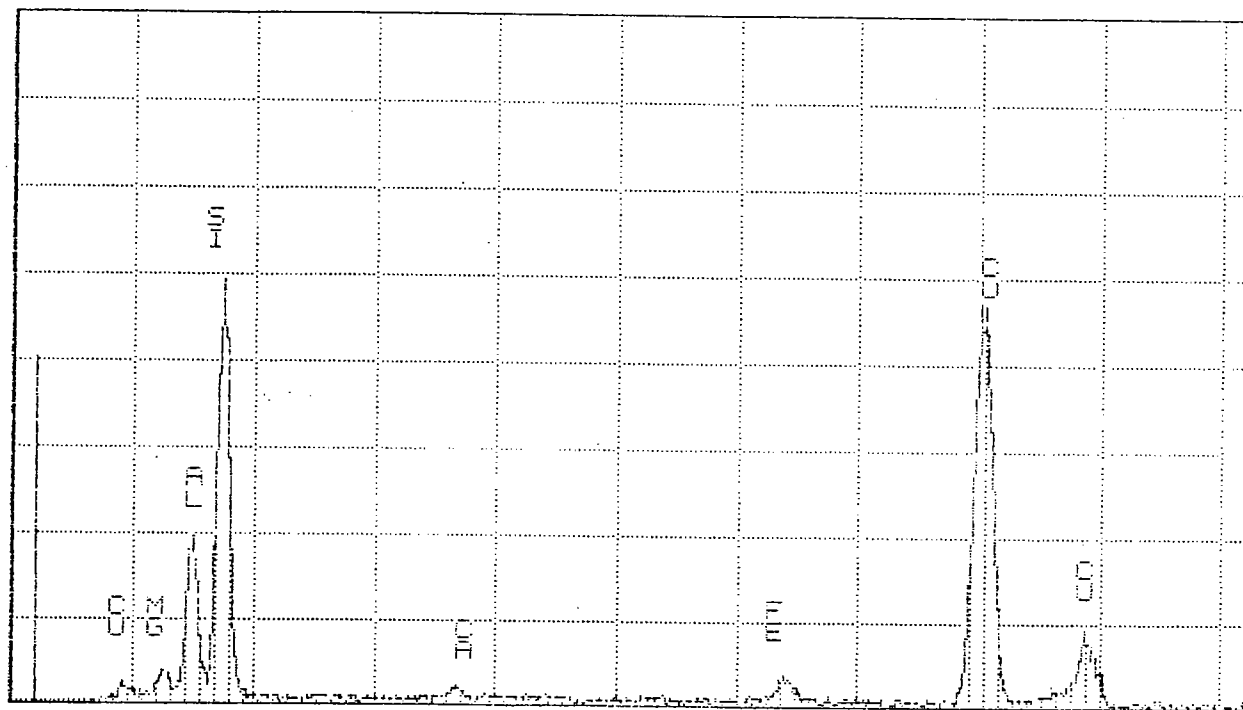
AEM spectrum of tremolite/actinolite
 MVA5394-N0024

MVA INC.

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0.000

B-5

VPS = 512

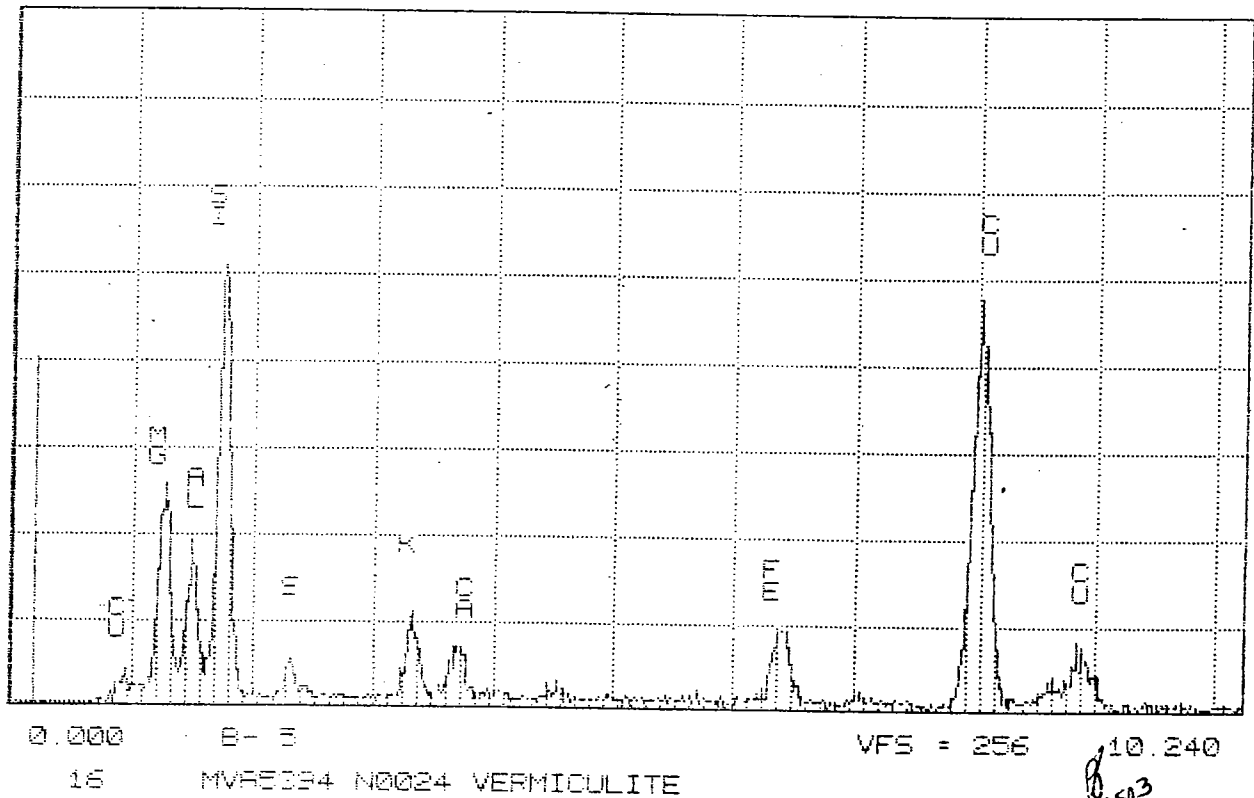
10.240

29

MVA5394 N0024 MONTMORILLONITE

82513

AEM spectrum of montmorillonite.
MVA5394-N0024



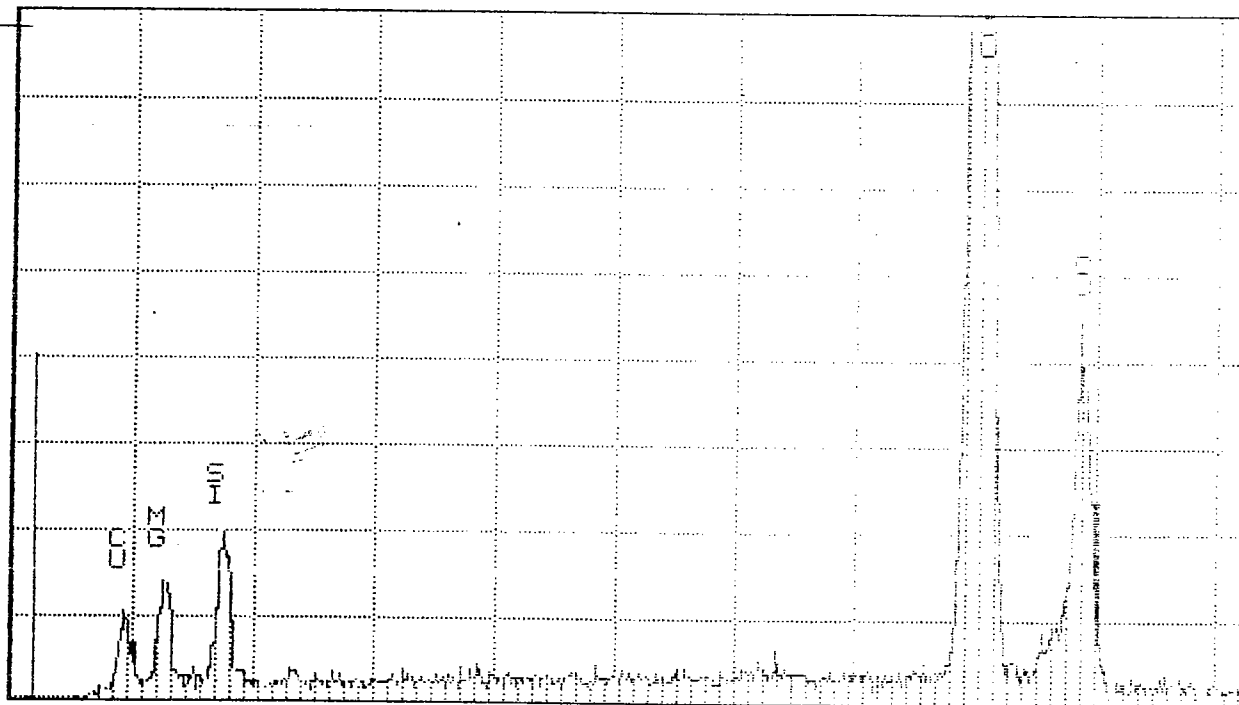
AEM spectrum of vermiculite.
MVA5394-N0024

MVA INC.

THU 27-FEB-03 11:27

Cursor: 0.000keV = 0

ROI (1) 0.000: 0.000



0.000

B- 5

VFS = 256

10.240

49

MVA5394 N0024 CHRYSOTILE

P2-2703

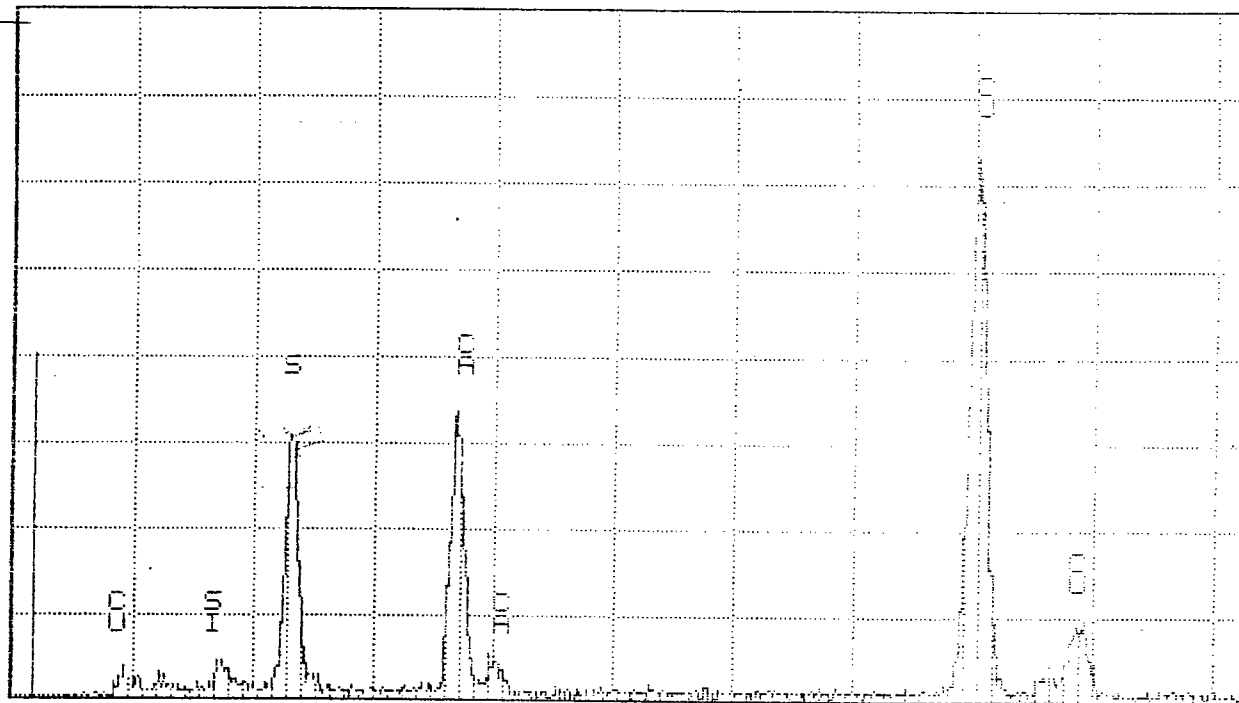
AEM spectrum of chrysotile.
MVA5394-N0024

MVA INC.

THU 27-FEB-02 11:20

Cursor: 0.000keV = 0

ROI (1) 0.000: 0.000



0.000

B- 5

VFS = 256 10.240

21

MVA5394 N0024 CA-S FIBERS

022703

AEM spectrum of Ca-S fibers.
MVA5394-N0024

MVA, Inc.

Acid Soluble Weight Percent Determination

Date: 2/6/03

MVA#: 5394

Sample I.D.#: N0024

Initial Weights

1.	Vial w/lid	4.76598
2.	Vial + Sample	4.98867
3.	Sample Weight (S2-S1)	0.22269
4.	Filter (in container)	10.34105

Weights Following Acid Treatment

5.	Filter + Sample	10.43117
6.	Insoluble Residue (S5-S4)	0.09012
7.	Soluble Fraction (S3-S6)	0.13257

Calculation

8.	% Soluble (S7/S3) x 100%	~59.5%
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Comments:

Analyst: Bill Turner

MVA, Inc.**PLM Constituent Analysis****Date:** 1/9/03**MVA #:** 5394**Location:** 7650 S. Newcastle Rd., Bldg. 969,
West Side Entrance Storage Room West**Sample I.D. #:** N0026**Client Sample I.D. #** 969-1-8-03-AT-1**Examination using the stereomicroscope:** Off-white powder with brass-colored flakes and white fibers

<u>CONSTITUENT</u>	<u>%</u>	<u>CONSTITUENT</u>	<u>%</u>	<u>CONSTITUENT</u>	<u>%</u>
Fibers:		Pigment:		Fillers:	
Cotton	---	Binders:		Diatoms	---
Fiberglass	---	Kaolinite (-)	---	Iron Chromite	---
Filament	---	Montmorillonite (-)	---	Iron Oxide	---
Wool	---	Gypsum	~55	Limestone	*
Mineral Wool	---	Anhydrite	<1	Magnetite	~1
Hair	---	Portland Cement	---	Mica	---
Paper/Wood	---	Lime (hydrated)	---	Perlite	---
Chem. Proc.	---	Precipitated		Synthetic Foam	---
Mech. Proc.	---	Carbonate	*	Pumice	---
Synthetic	---	Starch (-)	---	Quartz	---
				Talc	---
				Vermiculite	~33

Asbestos Minerals

Chrysotile	~12	Anthophyllite	---	Tremolite/	
Amosite	---	Crocidolite	---	Actinolite	---

Comments: *Trace/minor limestone/precipitated carbonate is included in the gypsum percentage.**Analyst:** Randy Boltin

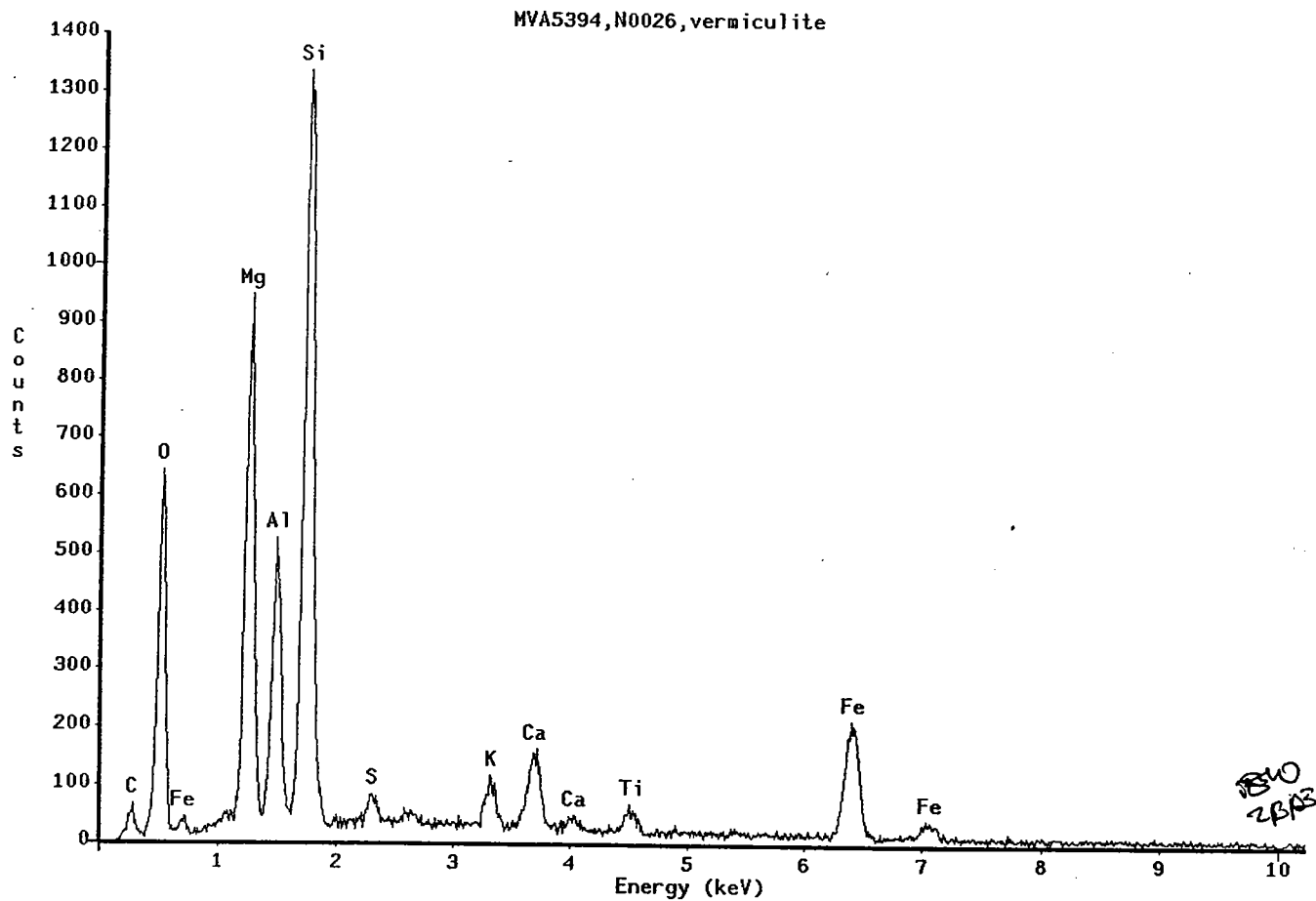
MVA, Inc.**SEM Constituent Analysis****Date:** 2/13/03**MVA #:** 5394

*Particles identified are consistent in morphology and elemental composition with known references.

Sample I.D. #: N0026

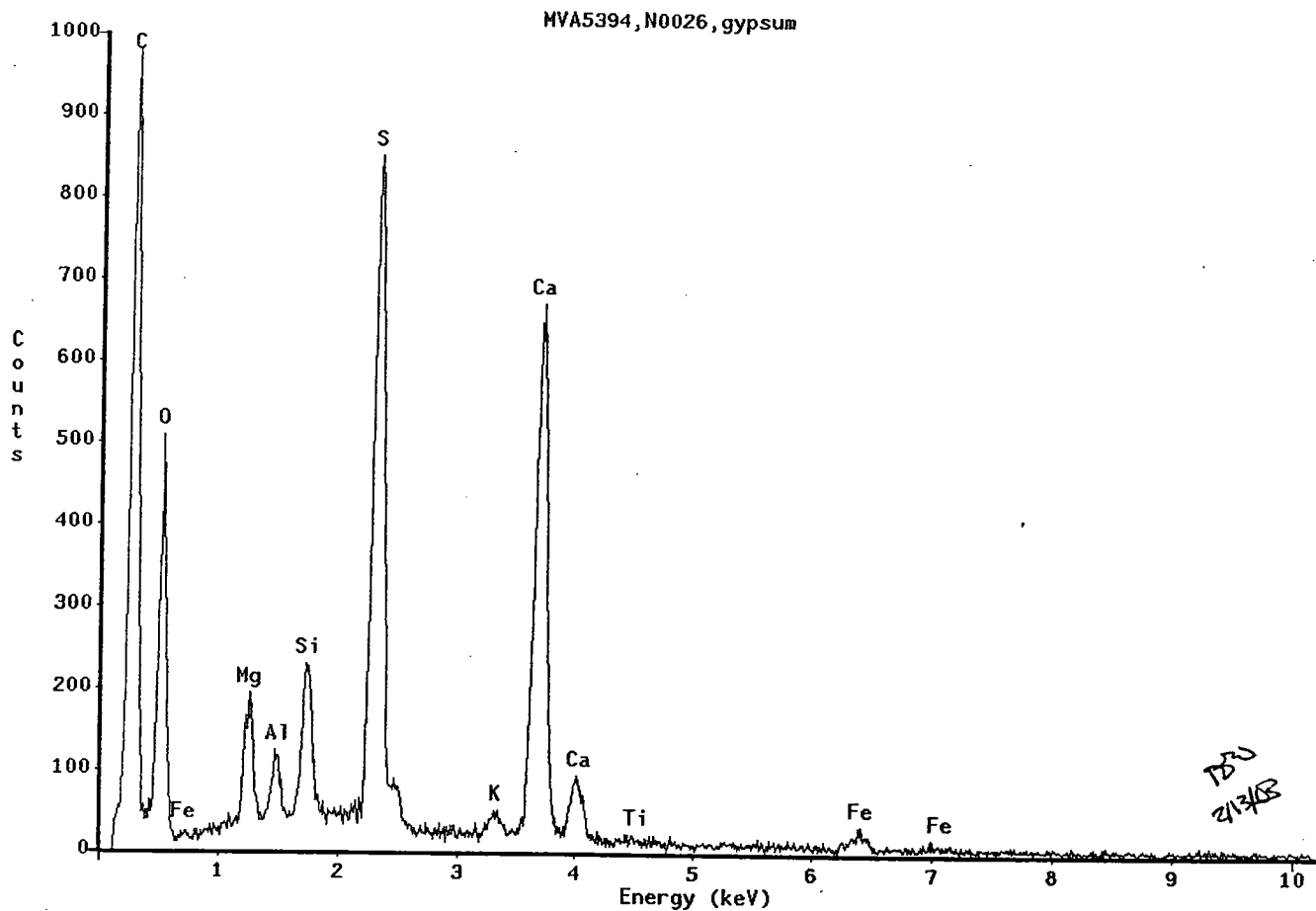
<u>CONSTITUENT</u>	<u>PRESENT</u>	<u>CONSTITUENT</u>	<u>PRESENT</u>
Fibers:		Pigments:	
Glass	---	Titanium	---
Mineral Wool	---	Barium	---
Other	---	Zinc	---
		Other	---
Fillers:		Binders:	
Diatoms	---	Clay	
Fe Particle	---	Kaolin	---
Mica	---	Montmorillonite	---
Perlite	---	Other	---
Talc (elong)	---	Ca	Trace
Talc (platy)	---	Ca-Mg	---
Si	---	Ca-S	Common
Vermiculite	Common	Ca-Si	---
Other	---	Ca-Al-Si	---
		Ca-Fe-Al-Si	---
Asbestos Minerals:		Mg-Fe	---
Amosite	---	Al-Si	---
Anthophyllite	---	Others	---
Chrysotile	Common		
Crocidolite	---		
Tremolite/Actinolite	---		

Comments: One quartz grain observed.**Microscopist:** Tim B. Vander Wood



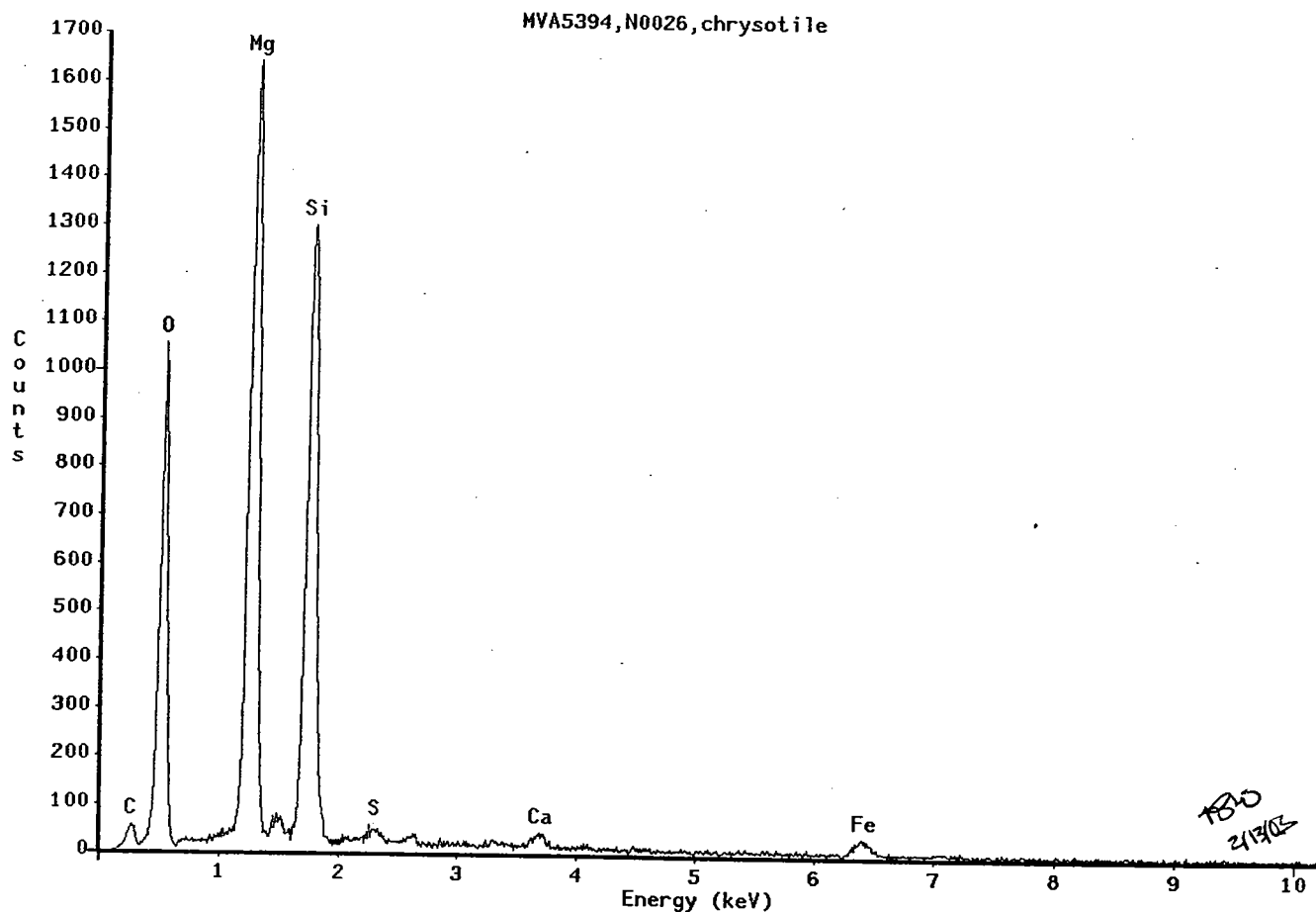
EDS spectrum (above) and SEM micrograph (below) of vermiculite.
MVA5394-N0026



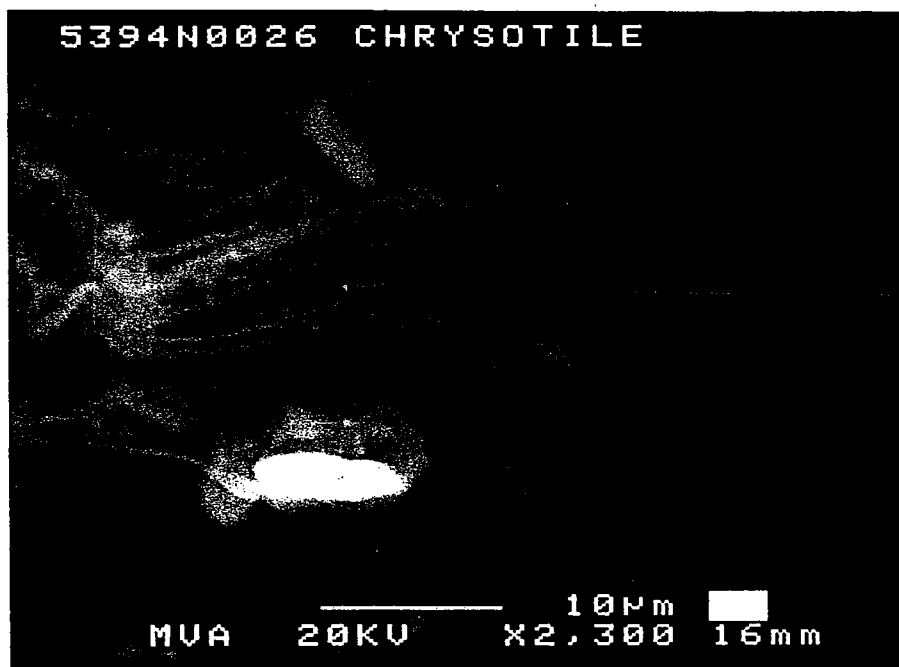


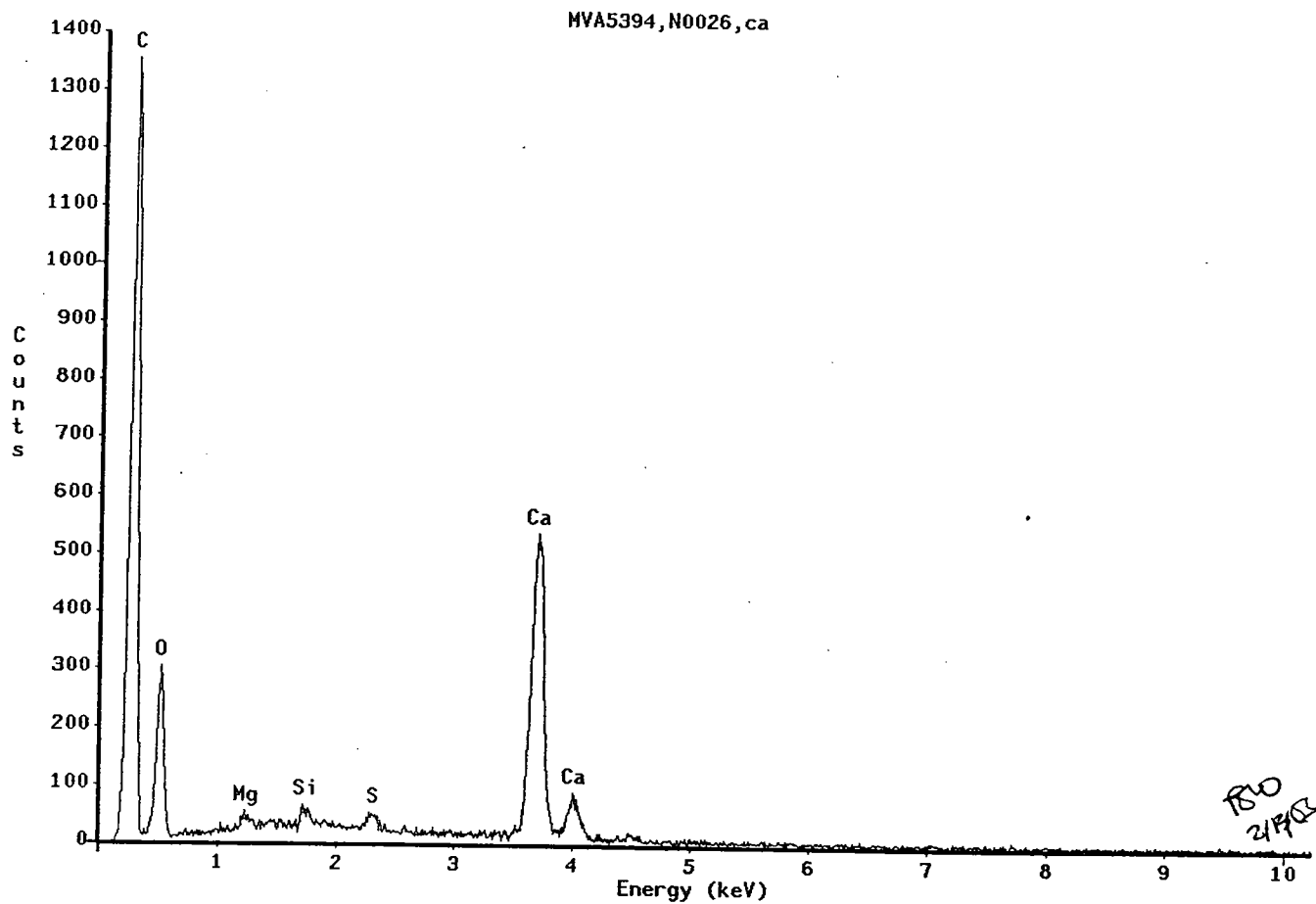
EDS spectrum (above) and SEM micrograph (below) of gypsum.
MVA5394-N0026





EDS spectrum (above) and SEM micrograph (below) of chrysotile.
MVA5394-N0026





EDS spectrum (above) and SEM micrograph (below) of a calcium particle.
MVA5394-N0026



MVA, Inc.**AEM Constituent Analysis****Date:** 2/26/03**MVA #:** 5394**Sample I.D. #:** N0026

<u>CONSTITUENT</u>	<u>PRESENT</u>	<u>CONSTITUENT</u>	<u>PRESENT</u>
Fibers:		Pigments:	
Glass fibers	---	TiO ₂	---
Others	---	BaSO ₄	---
		ZnS	---
		Other	---
Fillers:		Binders:	
Diatoms	---	Clay	
Fe Particle	---	Kaolin (xltln)	---
Mica	Trace	Kaolin (calc.)	---
Perlite	---	Smectite	---
Talc (elong)	---	Ca (ppt)	---
Talc (platy)	---	Ca (xtln)	Trace
Quartz	---	Ca-Mg, particle	---
Vermiculite	Common	Ca-S (ppt)	---
Other- Platy Mg-Si	Trace	Ca-S (xtln)	Common
Asbestos Minerals:		Ca-Si (ppt)	---
Amosite	---	Ca-Si, particle	---
Anthophyllite	---	Ca-Al-Si	---
Chrysotile	Common	Ca-Fe-Al-Si	---
Crocidolite	---	Mg-Fe, particle	---
Tremolite/Actinolite	---	Mg-S	---
		Si (ppt)	---
		Si (xtln)	---
		Others	---

Comments: Platy Mg-Si particles are a probable contaminant of chrysotile.**Analyst:** Randy Boltin

QUALITATIVE ELEMENT IDENTIFICATION

SAMPLE ID: MVA5394-N0026 VERMICULITE

POSSIBLE IDENTIFICATION

SI KA
 MG KA
 CU KA
 FE KA
 K -KA OR IN LA?
 AL KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.248	554	MG KA
2	1.483	183	AL KA
3	1.743	1002	SI KA
4	3.312	203	K KA OR IN LA?
5	6.395	267	FE KA
6	8.031	551	CU KA

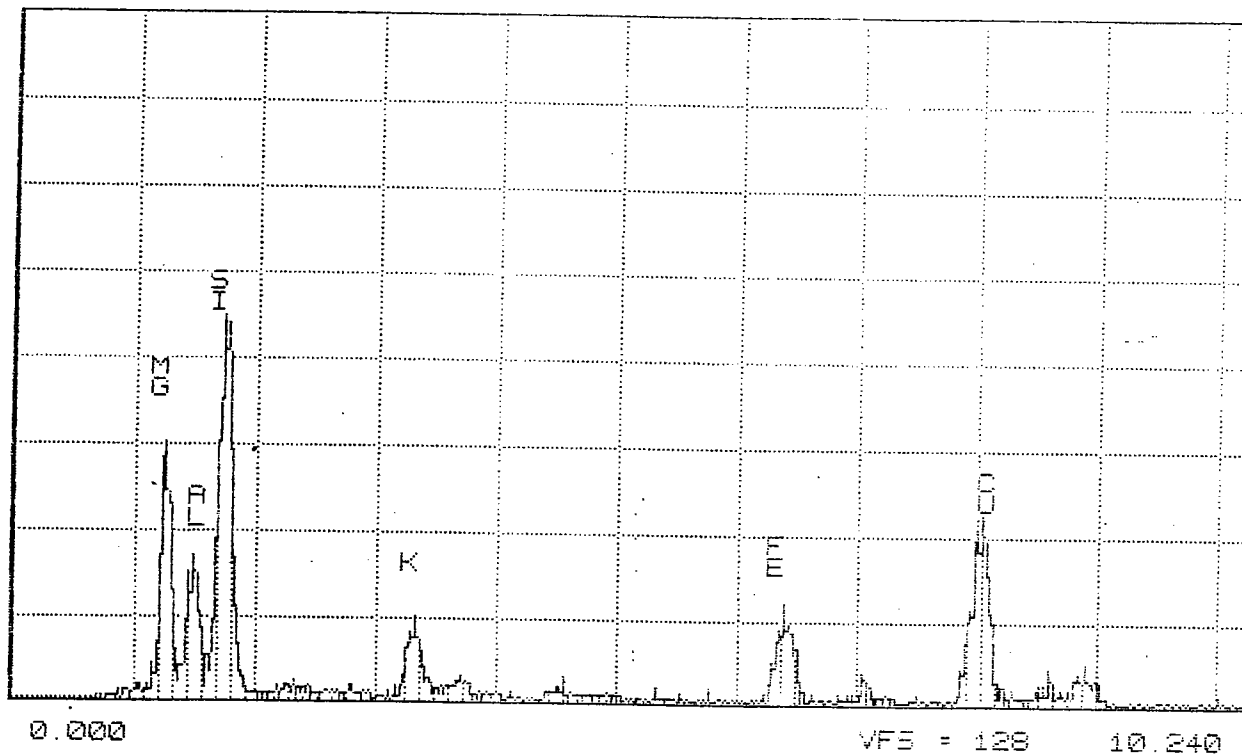
WMA
 2-26-03

MVA INC.

WED 26-FEB-03 15:37

Cursor: 0.000keV = 0

ROI (1) 0 000: 0.000



0.000

VFS = 128 10.240

91

MVA5394-N0026 VERMICULITE

AEM spectrum of vermiculite.
 MVA5394-N0026

QUALITATIVE ELEMENT IDENTIFICATION

SAMPLE ID: MVA5394-N0026 CA-S PARTICLE

POSSIBLE IDENTIFICATION

CA KA KB

S KA

CU KA KB

SI KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.740	99	SI KA
2	2.310	1397	S KA
3	3.687	1519	CA KA
4	4.015	169	CA KB
5	8.023	498	CU KA
6	8.888	75	CU KB

WAF
2-25-03

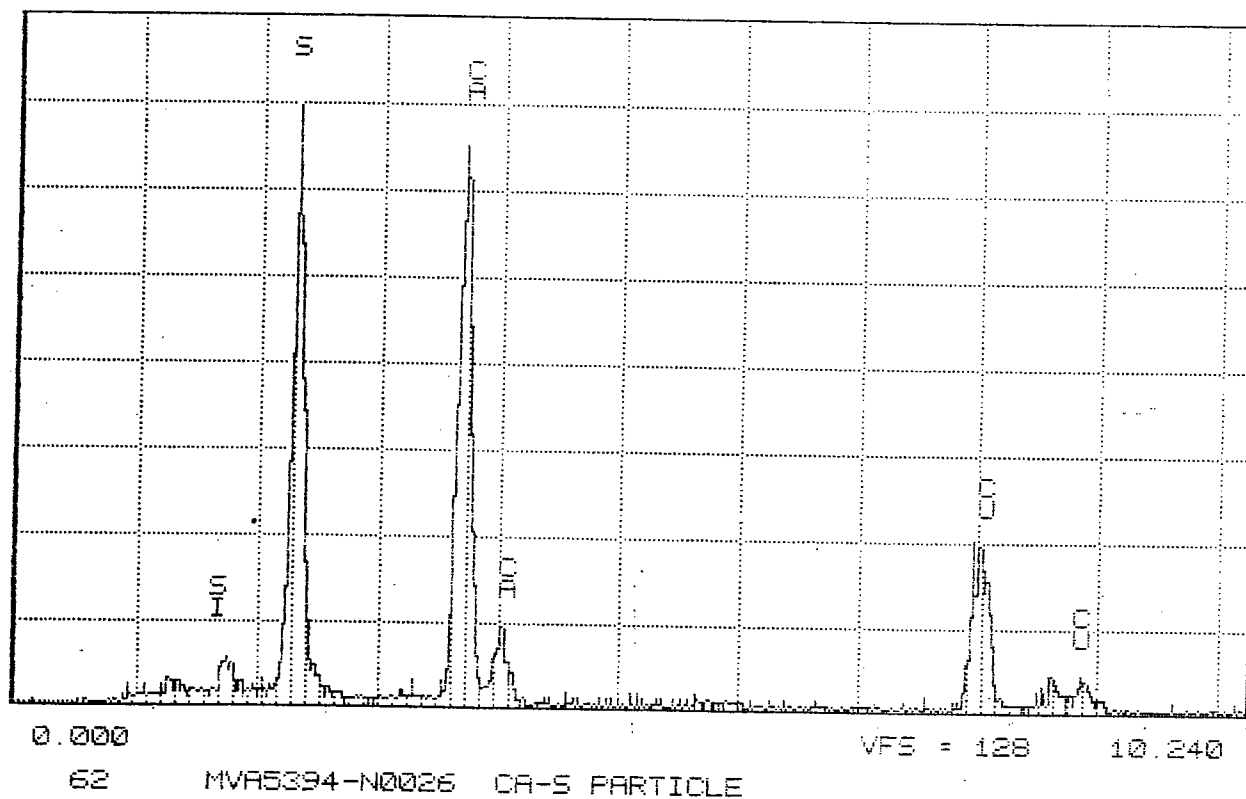
MVA INC.

WED 26-FEB-03 15:39

Cursor: 0.000keV = 0

ROI

(1) 0.000: 0.000



AEM spectrum of a Ca-S particle.
MVA5394-N0026

QUALITATIVE ELEMENT IDENTIFICATION

SAMPLE ID: MVA5394-N0026 CHRYSOTILE

POSSIBLE IDENTIFICATION

CU KA KB LA
 SI KA
 MG KA
 ZN KA OR OS LA
 FE KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	0.926	323	CU LA
2	1.254	3994	MG KA
3	1.743	4500	SI KA
4	6.371	186	FE KA
5	8.023	11742	CU KA
6	8.583	207	ZN KA
7	8.880	1504	CU KB

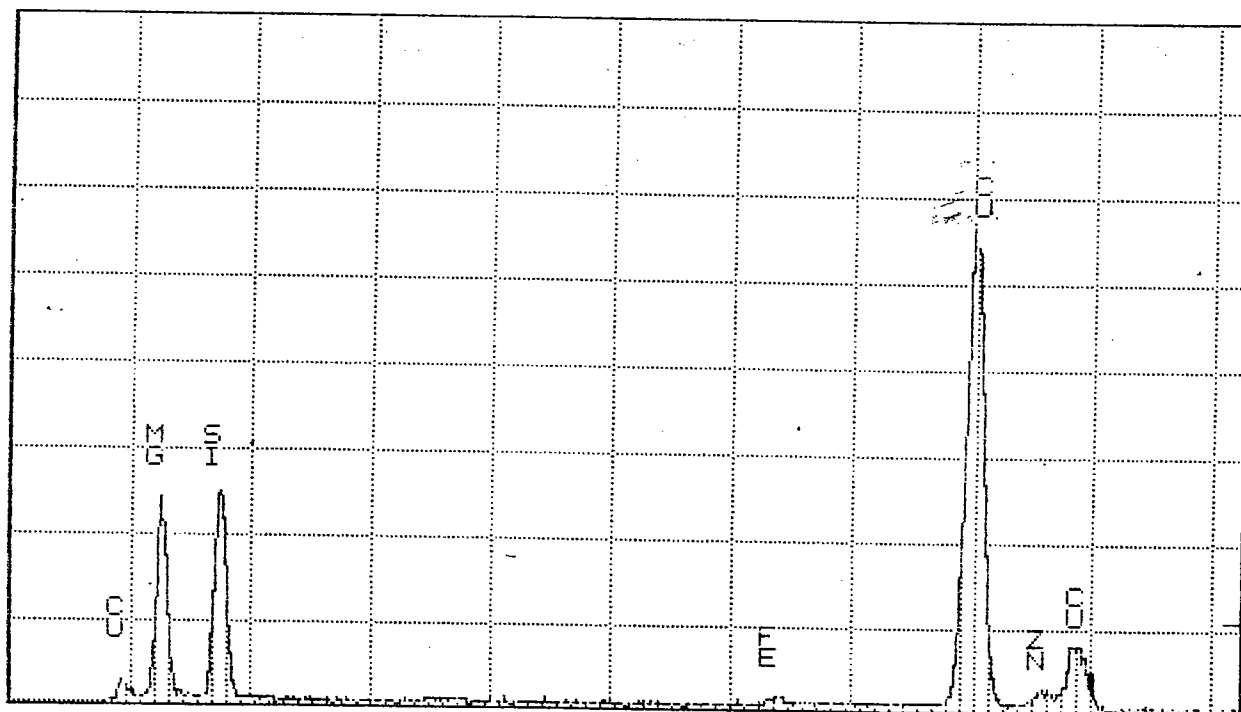
WAB
 2-26-03

MVR INC.

WED 26-FEB-03 15:49

Cursor: 0.000keV = 0

ROI (1) 0.000: 0.000



0.000

VFS = 1024 10.240

115

MVA5394-N0026 CHRYSOTILE

AEM spectrum of chrysotile.
 MVA5394-N0026

QUALITATIVE ELEMENT IDENTIFICATION

SAMPLE ID: MVA5394-N0026 MICA

POSSIBLE IDENTIFICATION

SI KA

CU KA

AL KA

K KA OR IN LA?

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.482	450	AL KA
2	1.745	953	SI KA
3	3.313	183	K KA OR IN LA?
4	8.023	454	CU KA

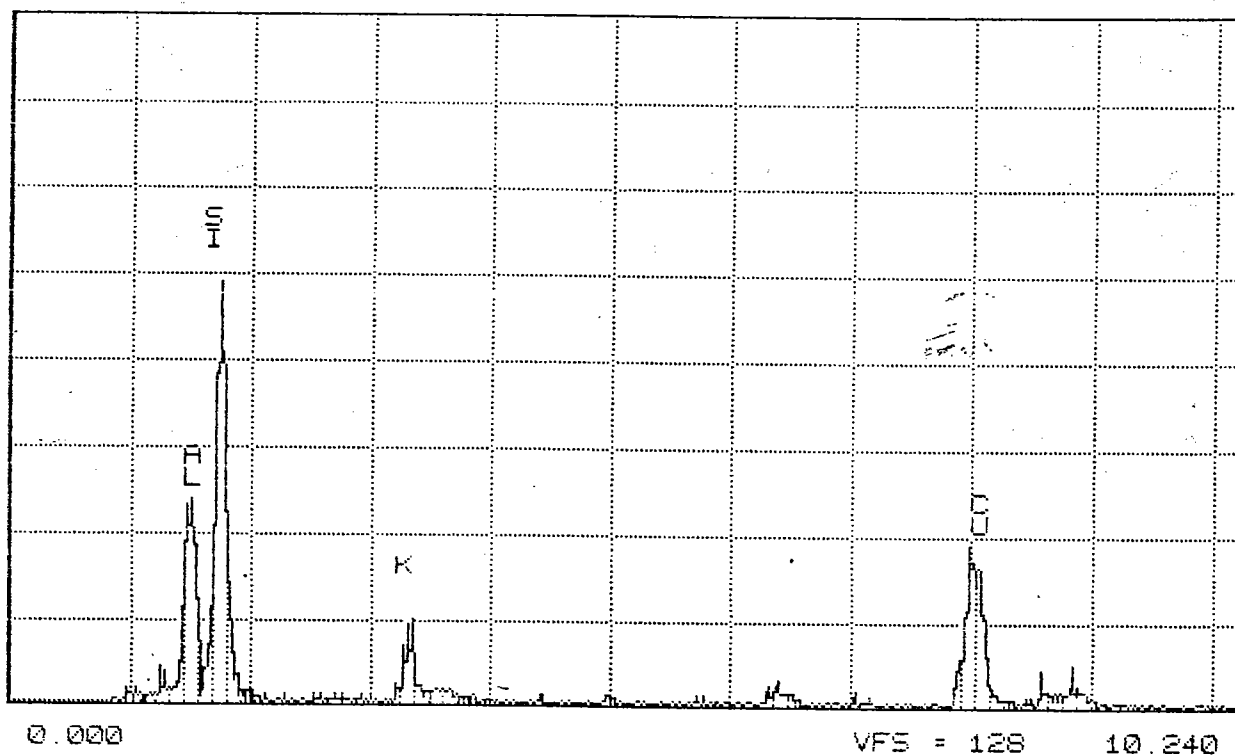
*WHS
2-26-03*

MVA INC.

WED 26-FEB-03 15:57

Cursor: 0.000keV = 0

ROI (1) 0.000: 0.000



0.000

VFS = 128

10.240

60

MVA5394-N0026 MICA

AEM spectrum of mica.
MVA5394-N0026

SAMPLE ID:MVA5394-N0026 CA PARTICLE

POSSIBLE IDENTIFICATION

CA KA KB
CU KA KB
SI KA
MG KA
ZN KA OR RE LA
K KA OR IN LA?
S KA
AL KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.248	394	MG KA
2	1.483	83	AL KA
3	1.743	672	SI KA
4	2.320	91	S KA
5	3.324	116	K KA OR IN LA?
6	3.689	4413	CA KA
7	4.019	478	CA KB
8	6.023	834	CU KA
9	8.596	139	ZN KA
10	8.886	115	CU KB

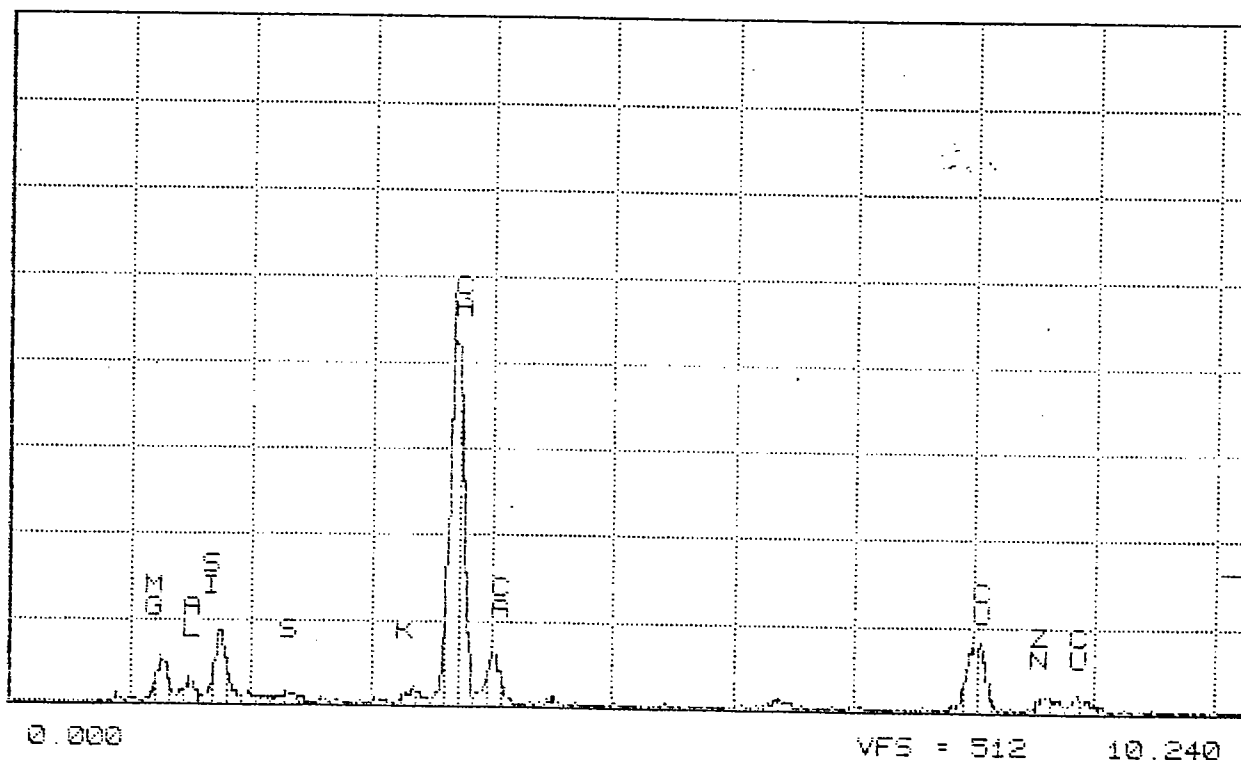
W/ly
2-26-03

MVA INC.

WED 26-FEB-03 16:02

Cursor: 0.000keV = 0

ROI (1) 0.000: 0.000



MVA5394-N0026 CA PARTICLE

AEM spectrum of a calcium particle.
MVA5394-N0026

QUALITATIVE ELEMENT IDENTIFICATION

SAMPLE ID: MVA5394-N0026 FLATY MG-SI PARTICLE

POSSIBLE IDENTIFICATION

SI KA
 MG KA
 CU KA
 FE KA
 ZN KA OR RE LA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.254	1400	MG KA
2	1.743	1750	SI KA
3	6.373	102	FE KA
4	8.023	649	CU KA
5	8.608	75	ZN KA

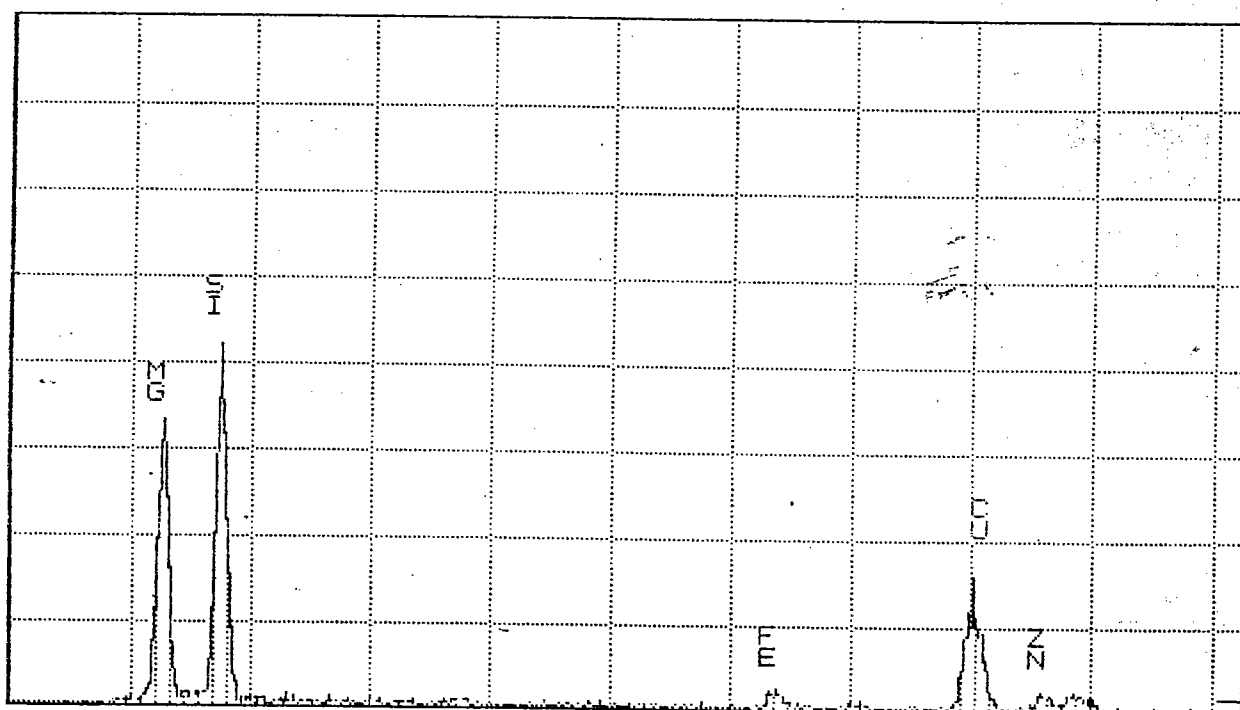
WAB
2-26-03

MVA INC.

WED 26-FEB-03 16:05

Cursor: 0.000keV = 0

ROI (1) 0.000: 0.000



0.000

VFS = 256

10.240

71

MVA5394-N0026 FLATY MG-SI PARTICLE

AEM spectrum of a platy Mg-Si particle.
 MVA5394-N0026

MVA, Inc.**Acid Soluble Weight Percent Determination****Date:** 2/6/03**MVA#:** 5394**Sample I.D.#:** N0026**Initial Weights**

1.	Vial w/lid	4.74337
2.	Vial + Sample	5.01369
3.	Sample Weight (S2-S1)	0.27032
4.	Filter (in container)	10.35501

Weights Following Acid Treatment

5.	Filter + Sample	10.51572
6.	Insoluble Residue (S5-S4)	0.16071
7.	Soluble Fraction (S3-S6)	0.10961

Calculation

8.	% Soluble (S7/S3) x 100%	~40.5%
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Comments:**Analyst:** Bill Turner